SOME UNUSUAL POLLINATION MECHANISMS IN WESTERN AUSTRALIAN WILDFLOWERS

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ABSTRACT

The pollen transfer mechanisms of some species of *Conospermum*, *Leschenaultia*, *Dampiera*, *Verticordia*, *Actinodium*, *Darwinia* and *Chamelaucium* are described. The question is raised: what are the pollinators?

Investigating Western Australian wildflowers for pollination and pollinating mechanisms in the spring of 1977, I found some flowers transferring pollen in a quite unexpected way.

The Stirling Range Smokebush *Conospermum dorrienii* (Fig. a-c) has an explosive mechanism. When an insect lands on the tiny platform, formed by the perianth, and lets its proboscis down to obtain nectar, it touches two staminodia, which act as triggers. This results in two events. *First,* the style smashes forward and touches the insect and puts an adhesive substance on its head. Before the explosion this adhesive sits like the rim of a hat around the stigma. *Second,* the anthers explode and dust pollen on the insect. Some of the pollen is caught by the adhesive on the insect.

One can release the explosion by touching the triggers with a straw and can hear the sound of the explosion.

Obviously the mechanism only functions once. The stigma then must

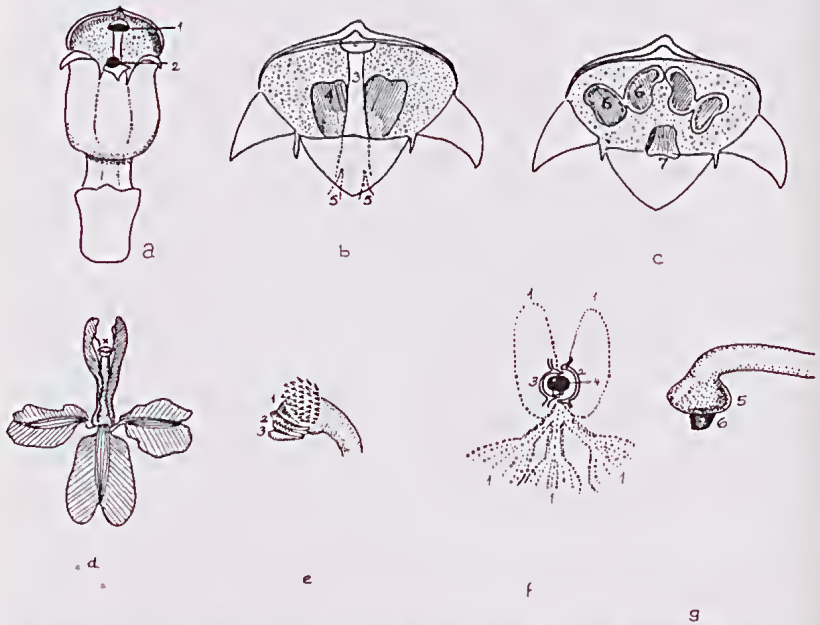

Fig. 1.—a, b, c: *Conospermum dorrienii:* a. 1, style before explosion. 2, position of style after explosion; b, flower before explosion; 3, style; 4, anther; 5, staminodia. c, flower after explosion; 6, anther opened; 7, style.

d, e. *Leschenaultia linarioides,* d, flower (x marks the indusium), e, indusium seen from side, 1, the sticky zone; 2, "mouth", containing the pollen; 3, lip.

f, g. *Dampiera,* schematic drawing, f, the position of the indusium (4) between the bowls (2, 3); 1, the petals; g, the indusium; 5, with its "nose" (6).

receive pollen from the same insect which releases the explosion if pollination is to take place.

Small insects can be caught by the style. I have seen an ant which could not free itself from the style, which was pressing it against the perianth.

The Plume Smokebush *(Conospermum incurvum)* has a similar mechanism, but must be visited by other insects as its perianth has another form.

Leschenaultia (Fig. d, e) also put an adhesive on their visitors. The style, when young, is formed like a goblet called the indusium. In the bottom of the goblet's cup the stigma is found. Before the bud opens the anthers empty their pollen in the cup. The anthers wilt, and the cup closes. Now the style grows out and the bud opens. When a visitor enters for nectar, it touches a part of the style, which is sticky. Then the visitor becomes sticky, and after that it touches a lip upon the style. This causes the mouth of the cup to open and the pollen comes out, fixing itself on the insect.

Apparently most of the pollen goes out at once. The next insect which touches the lip after a previous visit to another flower, will transfer pollen to the stigma.

I have closely investigated three species of *Leschenaultia*—the Blue Leschenaultia *(L. biloba)*, the Heath Leschenaultia *(L. tubiflora)* and *L. linarioides*. All had the same pollen transfer mechanism, though the flowers are so different that they must have very different pollinators.

Dampieras (Fig. f,g) are very queer. They also have a cup on the end of the style which is filled with pollen from the anthers while the flower is in bud. But unlike the Leschenaultias, the cup of the style has no sticky fluid. Instead the pollen itself is sticky and when an insect touches the "nose" of the cup, the pollen gets out, probably all of it at once, and fixes itself on the insect. The cup (indusium) is enclosed between two bowls (part of the perianth), and the insect must exert force to press the bowls away from the cup first. Then it can take up the nectar.

I have observed four species of *Dampiera* and found the same mechanism. These species are *D. coronata, D. hederacea, D. sericantha* and *D. teres*.

The Feather-flowers *(Verticordia), Actinodium cunninghamii* the Darwinias and some of the Chamaelaucieae all have their pollen embedded in a sticky fluid inside the anther. While in bud the anthers open, and the very viscid fluid runs off and is placed either on a brush on the style just below the stigma or (rarely) on the staminodia. From this place the pollinators can take the pollen away.

G. J. Keighery has previously described the pollinators of *Darwinia* (mostly birds). The Scarlet Feather-flower *(Verticordia grandis)* with its conspicuous red flowers and its stiff style also must be bird-pollinated.

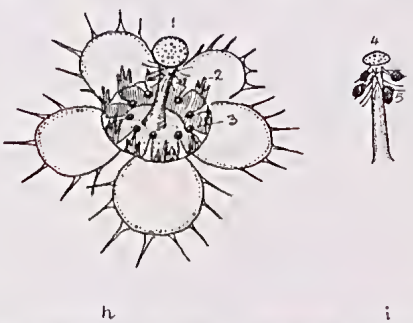

Fig. 2.—h, i. *Verticordia huegelii*, schematic drawing, the sepals are omitted. h, flower, 1, stigma; 2, staminodium; 3, anther after having released its pollen. i, style with stigma (4) and pollen masses (5) on the brush.

The other flowers which I have observed probably are insect-pollinated. I have studied five species of beetles on *Verticordia huegelii*, but none of them were pollinating, as no pollen was attached to their surfaces.

All the mechanisms described are unique to Australian plants, so far as I know. But though I have observed plants for nearly two months in Western Australia I have not seen pollinators on the described species. I should appreciate it very much if readers, who might have observations of pollinators on the above mentioned species, would tell me by writing to the *W.A. Naturalist*.

I also would be happy, if I could have information on pollinators on the following plants:

Isopogon formosus
Pixie Mops *(Petrophile linearis)*
Long-leaved Petrophile *(P. longifolia)*
Fringe-Lily *(Thysanotus multiflorus)*
Hybanthus calycinus
Yellow Buttercups *(Hibbertia hypericoides)*
Woodbridge Poison *(Isotoma hypocrateriformis)*
Audersonia caerulea
Milkflower *(Comesperma virgatum)*
Boronia ternata.

REFERENCE

KEIGHERY, G. J., 1975. Parallel evolution of Floral Structures in *Darwinia* and *Pimelea*. *W. Aust. Nat.*, 13 (2/3):

Note: I thank Mr Keighery for telling me that *Conospermum* has an explosive mechanism.

NOTES ON THE BIRDS OF PELSART ISLAND, ABROLHOS

By RAY GARSTONE, Woodanilling

The following notes were made during a visit to Pelsart Island, in the Southern Group of the Abrolhos Islands, between October 26 and 31, 1977.

Within an area from 0.5 km south of the guano jetty to 0.5 km of the southern end of the island there is an expanse of coral sand where vast numbers of sea-birds nest. The whole of this area is occupied by mainly three species which nest close together in a three-tiered society. The Common Noddies nest on the top of the bushes, the Sooty Terns underneath on the ground, and the Wedge-tailed Shearwaters in burrows beneath the surface. The Lesser Noddies, the other main breeding species, nest separately 2 km north of this area, in the mangroves. These four species occur in great numbers. At first sight there are masses of birds streaming in from many directions to form a vast swarm over the breeding area. The majority of the wheeling birds are Sooty Terns, in contrast to the Noddies, which just fly in and out, being content to sit quietly on the bushes. This wheeling swarm never seemed to vary all day long.

Giant Petrel, *Macronectes giganteus*.—The remains of two birds were found.

Wedge-tailed Shearwater, *Puffinus pacificus*.—Many birds were seen over the sea to the east of the island. Although many burrows were noted north of the guano jetty most were south of it. Most burrows had been excavated, with a few adult birds in occupation during the day. At dusk the bulk of the birds started to arrive and soon great numbers were skimming silently over the vegetation before alighting at their chosen spots.

Little Shearwater, *Puffinus assimilis*.—Three birds with white bellies, seen from the boat flying over the sea to the east of the island, were presumably of this species.